



1. Description

1.1. Project

Project Name	STM32G431KB_CAN
Board Name	custom
Generated with:	STM32CubeMX 6.8.0
Date	07/10/2023

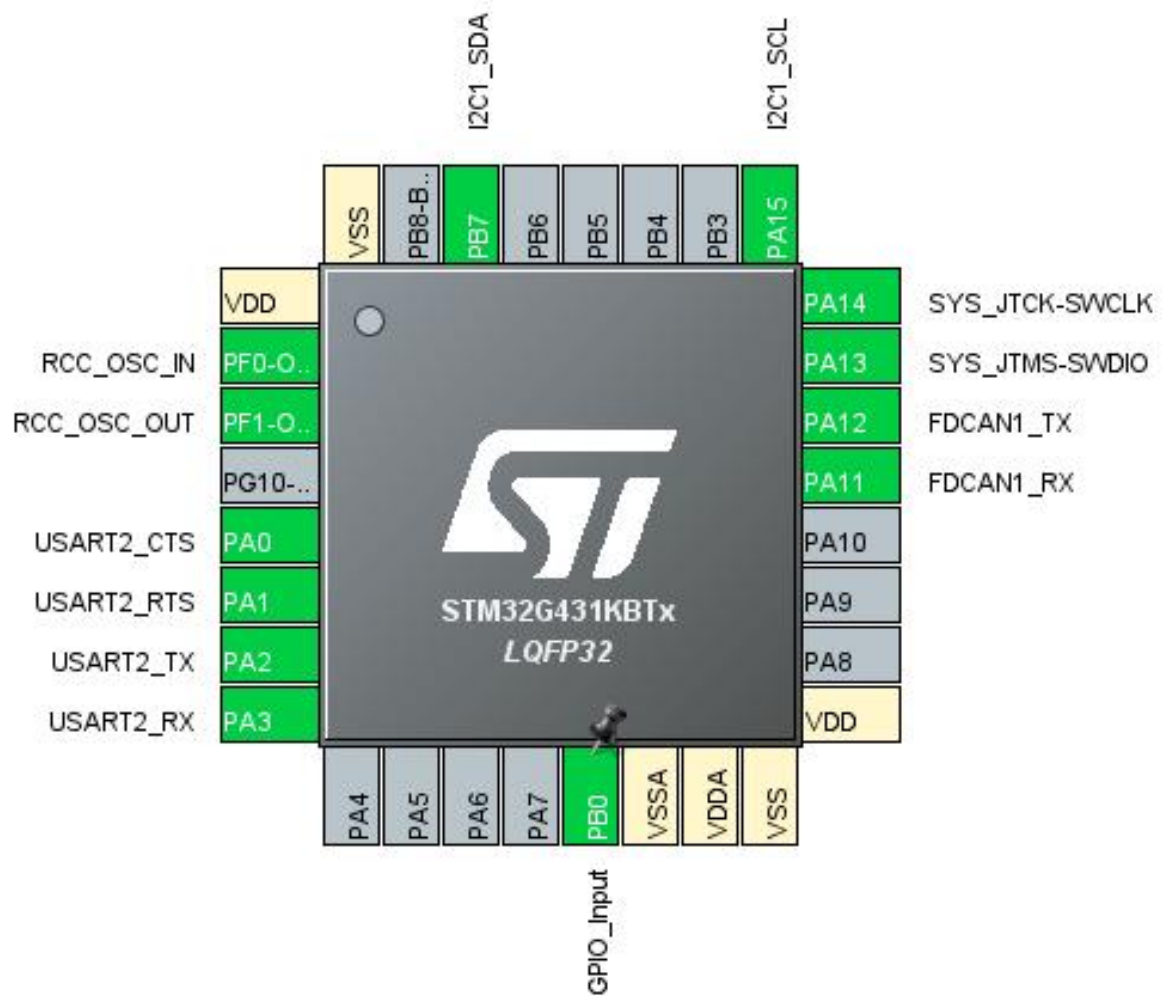
1.2. MCU

MCU Series	STM32G4
MCU Line	STM32G4x1
MCU name	STM32G431KBTx
MCU Package	LQFP32
MCU Pin number	32

1.3. Core(s) information

Core(s)	ARM Cortex-M4
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2. Pinout Configuration

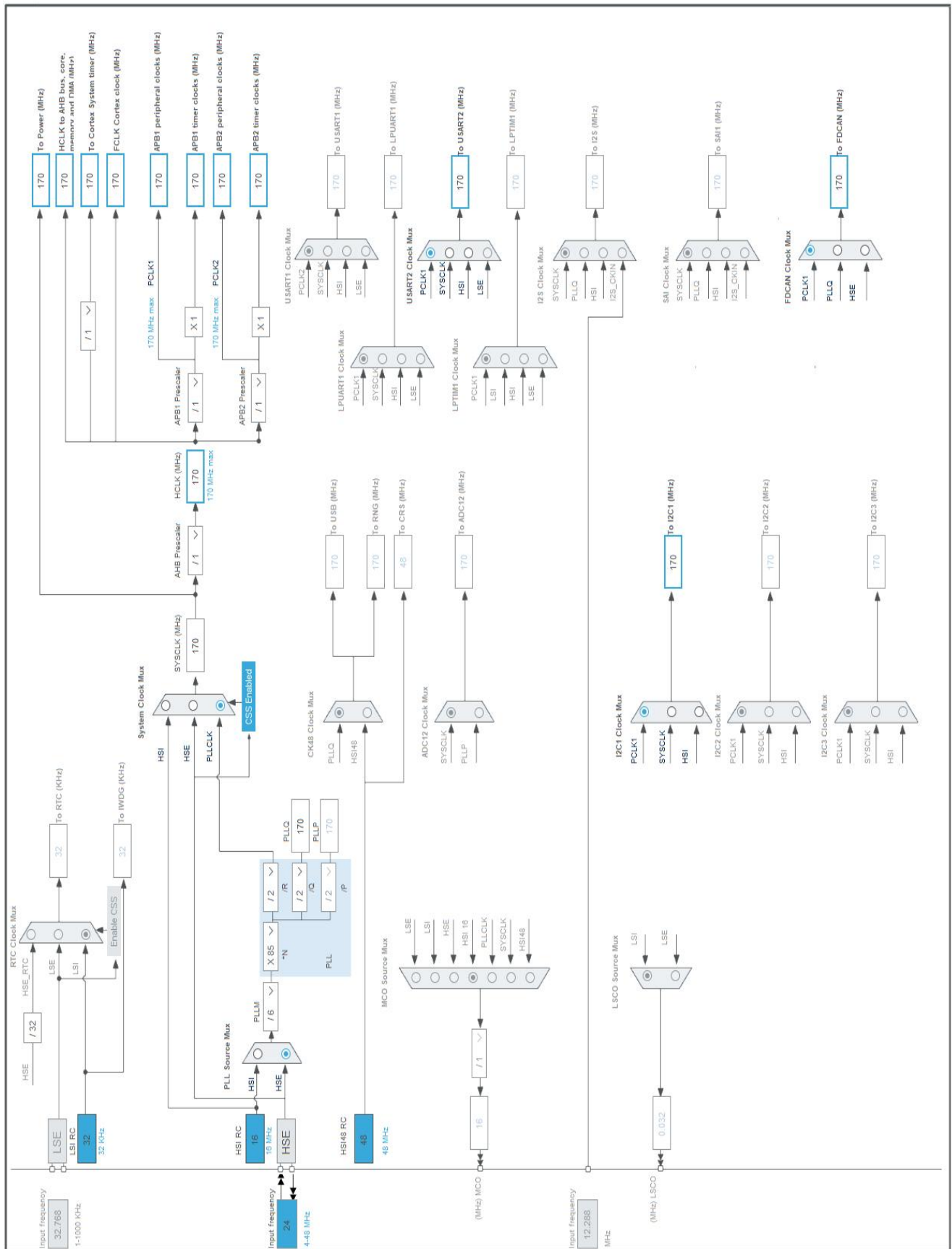


3. Pins Configuration

Pin Number LQFP32	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VDD	Power		
2	PF0-OSC_IN	I/O	RCC_OSC_IN	
3	PF1-OSC_OUT	I/O	RCC_OSC_OUT	
5	PA0	I/O	USART2_CTS	
6	PA1	I/O	USART2_RTS	
7	PA2	I/O	USART2_TX	
8	PA3	I/O	USART2_RX	
13	PB0 *	I/O	GPIO_Input	
14	VSSA	Power		
15	VDDA	Power		
16	VSS	Power		
17	VDD	Power		
21	PA11	I/O	FDCAN1_RX	
22	PA12	I/O	FDCAN1_TX	
23	PA13	I/O	SYS_JTMS-SWDIO	
24	PA14	I/O	SYS_JTCK-SWCLK	
25	PA15	I/O	I2C1_SCL	
30	PB7	I/O	I2C1_SDA	
32	VSS	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. Software Project

5.1. Project Settings

Name	Value
Project Name	STM32G431KB_CAN
Project Folder	C:\Users\jaesung\MRAS\GitHub\STM32\Projects\Exoskeleton\STM32G431KB_C
Toolchain / IDE	EWARM V8.50
Firmware Package Name and Version	STM32Cube FW_G4 V1.5.1
Application Structure	Advanced
Generate Under Root	No
Do not generate the main()	No
Minimum Heap Size	0x200
Minimum Stack Size	0x400

5.2. Code Generation Settings

Name	Value
STM32Cube MCU packages and embedded software	Copy only the necessary library files
Generate peripheral initialization as a pair of '.c/.h' files	Yes
Backup previously generated files when re-generating	No
Keep User Code when re-generating	Yes
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	No
Enable Full Assert	No

5.3. Advanced Settings - Generated Function Calls

Rank	Function Name	Peripheral Instance Name
1	SystemClock_Config	RCC
2	MX_GPIO_Init	GPIO
3	MX_DMA_Init	DMA
4	MX_FDCAN1_Init	FDCAN1
5	MX_I2C1_Init	I2C1
6	MX_USART2_UART_Init	USART2

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32G4
Line	STM32G4x1
MCU	STM32G431KBTx
Datasheet	DS12589_Rev0

6.2. Parameter Selection

Temperature	25
Vdd	3.0

6.3. Battery Selection

Battery	Li-SOCL2(A3400)
Capacity	3400.0 mAh
Self Discharge	0.08 %/month
Nominal Voltage	3.6 V
Max Cont Current	100.0 mA
Max Pulse Current	200.0 mA
Cells in series	1
Cells in parallel	1

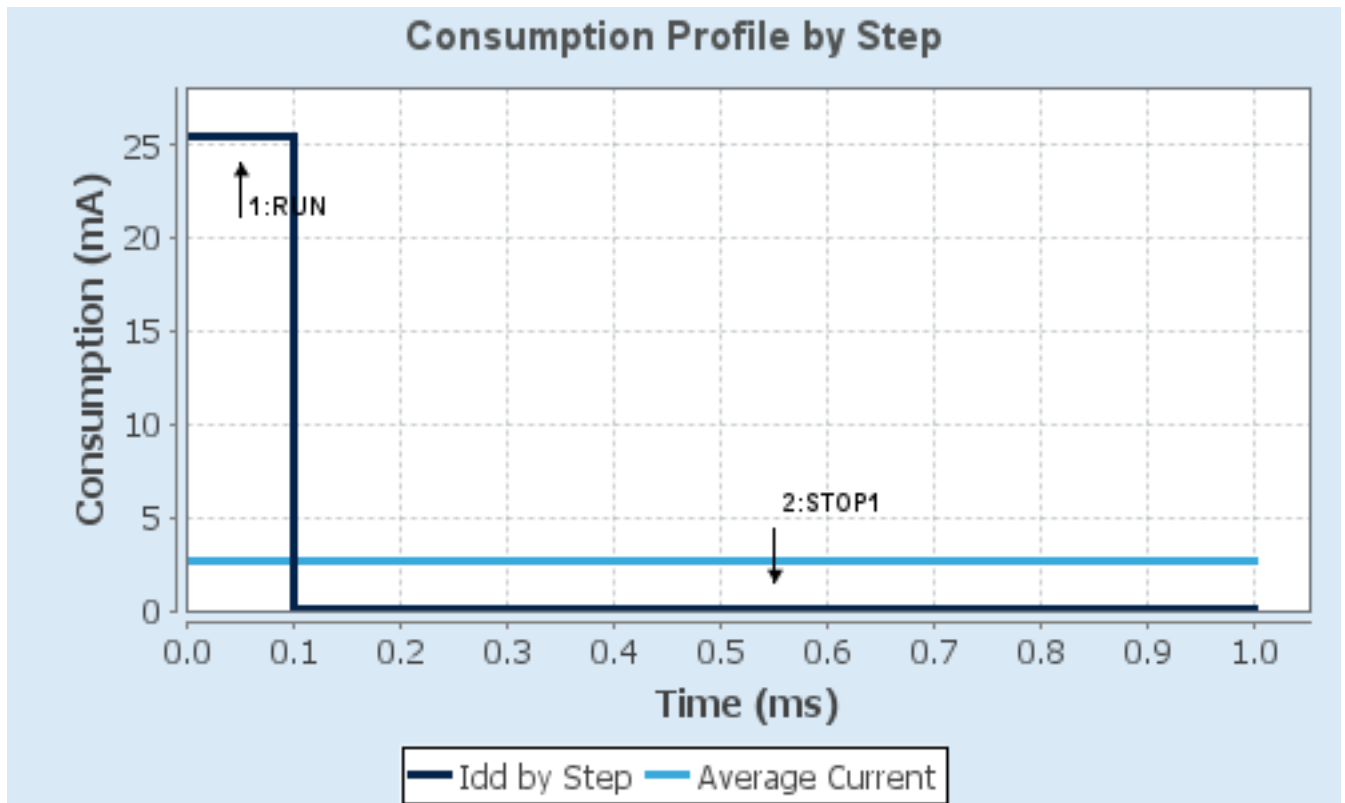
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP1
Vdd	3.0	3.0
Voltage Source	Battery	Battery
Range	Range1-Boost	NoRange
Fetch Type	FLASH/ART	NA
CPU Frequency	170 MHz	0 Hz
Clock Configuration	HSE BYP PLL	ALL CLOCKS OFF
Clock Source Frequency	4 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	25.5 mA	59 μ A
Duration	0.1 ms	0.9 ms
DMIPS	213.0	0.0
Ta Max	124.19	129.99
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	2.6 mA
Battery Life	1 month, 23 days, 22 hours	Average DMIPS	212.5 DMIPS

6.6. Chart



7. *Peripherals and Middlewares Configuration*

7.1. FDCAN1

mode: Activated

7.1.1. Parameter Settings:

Basic Parameters:

Clock Divider	Divide kernel clock by 1
Frame Format	Classic mode
Mode	Normal mode
Auto Retransmission	Enable *
Transmit Pause	Disable
Protocol Exception	Disable
Nominal Sync Jump Width	1
Data Prescaler	1
Data Sync Jump Width	1
Data Time Seg1	1
Data Time Seg2	1
Std Filters Nbr	28 *
Ext Filters Nbr	0
Tx Fifo Queue Mode	FIFO mode

Bit Timings Parameters:

Nominal Prescaler	10 *
Nominal Time Quantum	58.82352941176471 *
Nominal Time Seg1	14 *
Nominal Time Seg2	2
Nominal Time for one Bit	1000
Nominal Baud Rate	999999 *

7.2. I2C1

I2C: I2C

7.2.1. Parameter Settings:

Timing configuration:

Custom Timing	Disabled
I2C Speed Mode	Fast Mode *
I2C Speed Frequency (KHz)	400
Rise Time (ns)	26 *

Fall Time (ns)	2 *
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	0x20701F64 *

Slave Features:

Clock No Stretch Mode	Disabled
General Call Address Detection	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0

7.3. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

7.3.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled *
Data Cache	Disabled *
Flash Latency(WS)	4 WS (5 CPU cycle)

RCC Parameters:

HSI Calibration Value	64
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1 boost
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Peripherals Clock Configuration:

Generate the peripherals clock configuration	TRUE
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7.4. SYS

Debug: Serial Wire

Timebase Source: SysTick

mode: save power of non-active UCPD - deactive Dead Battery pull-up

7.5. USART2

Mode: Asynchronous

Hardware Flow Control (RS232): CTS/RTS

7.5.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples
Single Sample	Disable
ClockPrescaler	1
Fifo Mode	Disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

Advanced Features:

Auto Baudrate	Disable
TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX Pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
FDCAN1	PA11	FDCAN1_RX	Alternate Function Push Pull	Pull-up *	Very High *	
	PA12	FDCAN1_TX	Alternate Function Push Pull	Pull-up *	Very High *	
I2C1	PA15	I2C1_SCL	Alternate Function Open Drain	Pull-up *	Low	
	PB7	I2C1_SDA	Alternate Function Open Drain	Pull-up *	Low	
RCC	PF0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PF1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
USART2	PA0	USART2_CTS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA1	USART2_RTS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA3	USART2_RX	Alternate Function Push Pull	Pull-up *	Low	
GPIO	PB0	GPIO_Input	Input mode	Pull-up *	n/a	

8.2. DMA configuration

DMA request	Stream	Direction	Priority
USART2_RX	DMA1_Channel1	Peripheral To Memory	Medium *
USART2_TX	DMA1_Channel2	Memory To Peripheral	Low
I2C1_RX	DMA1_Channel3	Peripheral To Memory	High *
I2C1_TX	DMA1_Channel4	Memory To Peripheral	Low

USART2_RX: DMA1_Channel1 DMA request Settings:

Mode: **Circular ***
 Peripheral Increment: Disable
 Memory Increment: **Enable ***
 Peripheral Data Width: Byte
 Memory Data Width: Byte

USART2_TX: DMA1_Channel2 DMA request Settings:

Mode: Normal
 Peripheral Increment: Disable
 Memory Increment: **Enable ***
 Peripheral Data Width: Byte
 Memory Data Width: Byte

I2C1_RX: DMA1_Channel3 DMA request Settings:

Mode: Normal
 Peripheral Increment: Disable
 Memory Increment: **Enable ***
 Peripheral Data Width: Byte
 Memory Data Width: Byte

I2C1_TX: DMA1_Channel4 DMA request Settings:

Mode: Normal
 Peripheral Increment: Disable
 Memory Increment: **Enable ***
 Peripheral Data Width: Byte

Memory Data Width: Byte

8.3. NVIC configuration

8.3.1. NVIC

Interrupt Table	Enable	Preenmption Priority	SubPriority
Non maskable interrupt	true	0	0
Hard fault interrupt	true	0	0
Memory management fault	true	0	0
Prefetch fault, memory access fault	true	0	0
Undefined instruction or illegal state	true	0	0
System service call via SWI instruction	true	0	0
Debug monitor	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	0	0
Flash global interrupt	true	0	0
RCC global interrupt	true	0	0
DMA1 channel1 global interrupt	true	4	0
DMA1 channel2 global interrupt	true	4	0
DMA1 channel3 global interrupt	true	0	0
DMA1 channel4 global interrupt	true	0	0
FDCAN1 interrupt 0	true	1	0
FDCAN1 interrupt 1	true	1	0
I2C1 event interrupt / I2C1 wake-up interrupt through EXTI line 23	true	0	0
I2C1 error interrupt	true	0	0
USART2 global interrupt / USART2 wake-up interrupt through EXTI line 26	true	10	0
FPU global interrupt	true	5	0
PVD/PVM1/PVM2/PVM3/PVM4 interrupts through EXTI lines 16/38/39/40/41	unused		

8.3.2. NVIC Code generation

Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	false	true	true
Hard fault interrupt	false	true	false
Memory management fault	false	true	false
Prefetch fault, memory access fault	false	true	false
Undefined instruction or illegal state	false	true	false
System service call via SWI instruction	false	true	false
Debug monitor	false	true	false
Pendable request for system service	false	true	false
System tick timer	false	true	true

Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Flash global interrupt	false	true	true
RCC global interrupt	false	true	false
DMA1 channel1 global interrupt	false	true	true
DMA1 channel2 global interrupt	false	true	true
DMA1 channel3 global interrupt	false	true	true
DMA1 channel4 global interrupt	false	true	true
FDCAN1 interrupt 0	false	true	true
FDCAN1 interrupt 1	false	true	true
I2C1 event interrupt / I2C1 wake-up interrupt through EXTI line 23	false	true	true
I2C1 error interrupt	false	true	true
USART2 global interrupt / USART2 wake- up interrupt through EXTI line 26	false	true	true
FPU global interrupt	false	true	false

* User modified value

9. System Views

9.1. Category view

9.1.1. Current

Middleware							
System Core	Analog	Timers	Connectivity	Multimedia	Security	Computing	Utilities
DMA ✓			FDCAH1 ✓				
GPIO ✓			I2C1 ✓				
IVVIC ✓			USART2 ✓				
RCC ✓							
SYS ✓							

10. Docs & Resources

Type	Link
BSDL files	https://www.st.com/resource/en/bsdl_model/stm32g4_bsd1.zip
IBIS models	https://www.st.com/resource/en/ibis_model/stm32g4_ibis.zip
System View Description	https://www.st.com/resource/en/svd/stm32g4_svd.zip
BSDL files	https://www.st.com/resource/en/bsdl_model/stm32g4_bsd1.zip
IBIS models	https://www.st.com/resource/en/ibis_model/stm32g4_ibis.zip
System View Description	https://www.st.com/resource/en/svd/stm32g4_svd.zip
Presentations	https://www.st.com/resource/en/product_presentation/microcontrollers_stm32g4_series_product_overview.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32-stm8_embedded_software_solutions.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32_eval-tools_portfolio.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32-stm8_functional-safety-packages.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32-usb-c-pd-solutions-presentation.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32-stm8_software_development_tools.pdf
Training Material	https://www.st.com/resource/en/marketing_training/smpres_stm32g4_er.pdf
Training Material	https://www.st.com/resource/en/sales_guide/sg_sc2155.pdf
Training Material	https://www.st.com/resource/en/training_certification/faecp_stm32g4_edr.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32g4.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32nucleo.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32trust.pdf

Flyers	https://www.st.com/resource/en/flyer/fldpstpfc11120.pdf
Application Notes	https://www.st.com/resource/en/application_note/an1181-electrostatic-discharge-sensitivity-measurement-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an1709-emc-design-guide-for-stm8-stm32-and-legacy-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2606-stm32-microcontroller-system-memory-boot-mode-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2639-soldering-recommendations-and-package-information-for-leadfree-ecopack-mcus-and-mpus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2834-how-to-get-the-best-adc-accuracy-in-stm32-microcontrollers-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3126-audio-and-waveform-generation-using-the-dac-in-stm32-products-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3155-uart-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3156-usb-dfu-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4013-stm32-crossseries-timer-overview-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4221-i2c-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4229-how-to-implement-a-vocoder-solution-using-stm32-microcontrollers-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4232-getting-started-with-analog-comparators-for-stm32f3-series-and-stm32g4-series-devices-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4286-spi-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4296-use-stm32f3stm32g4-ccm-sram-with-iar-embedded-workbench-keil-mdkarm-

stmicroelectronics-stm32cubeide-and-other-gnubased-toolchains-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4566-extending-the-dac-performance-of-stm32-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4635-minimization-of-power-consumption-using-lpuart-for-stm32-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4655-virtually-increasing-the-number-of-serial-communication-peripherals-in-stm32-applications-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4750-handling-of-soft-errors-in-stm32-applications-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4759-using-the-hardware-realtime-clock-rtc-and-the-tamper-management-unit-tamp-with-stm32-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4776-generalpurpose-timer-cookbook-for-stm32-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4803-highspeed-si-simulations-using-ibis-and-boardlevel-simulations-using-hyperlynx-si-on-stm32-mcus-and-mpus-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4838-managing-memory-protection-unit-in-stm32-mcus-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4894-EEPROM-emulation-techniques-and-software-for-stm32-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4989-stm32-microcontroller-debug-toolbox-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an5027-interfacing-PDM-digital-microphones-using-stm32-mcus-and-mpus-stmicroelectronics.pdf

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stmicroelectronics.pdf

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& Software

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Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an4657-stm32-inapplication-programming-iap-using-the-usart-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an4759-using-the-hardware-realtime-clock-rtc-and-the-tamper-management-unit-tamp-with-stm32-microcontrollers-stmicroelectronics.pdf
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Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5056-integration-guide-for-the-xcubesbsfu-stm32cube-expansion-package-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5305-digital-filter-implementation-with-the-fmac-using-stm32cubeg4-mcu-package-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5315-stm32cube-firmware-examples-for-stm32g4-series-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5345-highbrightness-rgb-led-control-using-the-bg474edpow1-discovery-kit-stmicroelectronics.pdf
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